National Transportation Safety Board
Aviation Accident Final Report

Location:	SOMERVILLE, NJ	**Accident Number:**	NYC98FA073
Date & Time:	03/04/1998, 1410 EST	**Registration:**	N3374P
Aircraft:	Piper PA-23-160	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

"THIS CASE WAS MODIFIED AUGUST 2, 2006."

The Piper Apache was cruising at about 1,500 feet AGL, when a witness saw the vertical stabilizer start to oscillate and then separate from the airplane. The airplane descended and struck a multiple family dwelling. Examination of the wreckage revealed the outboard wing panels had separated from the airplane in flight due to downward bending forces that occurred after the in-flight separation of the horizontal stabilizer. The horizontal stabilizer was found next to the vertical stabilizer apart from the main fuselage and wing wreckage and had separated, in-flight, in a horizontal twisting motion that pushed the left tip of the horizontal stabilizer rearward. An impact mark on the left outboard leading edge of the horizontal stabilizer was consistent with a soft bodied impact that occurred prior to ground impact. Although one witness reported seeing several birds flying in the area at the time of the accident, examination of the left horizontal stabilizer and elevator failed to find any evidence of blood, feathers, or bird remains. A detailed and comprehensive examination of the accident site area failed to reveal any evidence of a bird carcass, or bird feathers. Aircraft components composed of both aluminum and fiberglass were mounted forward of the empennage, however the impact mark showed no residual evidence of being struck by either material. A determination of the source of the soft bodied impact could not be made. The vertical stabilizer is attached to the horizontal stabilizer, and this assembly is then attached to the fuselage through four attach points. The damage to the vertical stabilizer attach points indicates that they failed toward the left (as viewed from the rear looking forward) and were securely attached to the horizontal stabilizer at the time of failure. Three of the four bolts that attach the horizontal stabilizer to the fuselage were recovered. The forward two attach points were torn out of the horizontal stabilizer during the in-flight separation. Compression damage to the lower skin immediately forward of the aft, left attach point indicates that it was securely attached. No evidence was found to indicate that any of the attach points were unsecured prior to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: in-flight separation of the empennage for undetermined reasons.

"THIS CASE WAS MODIFIED AUGUST 2, 2006."

Findings

Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION
Phase of Operation: CRUISE - NORMAL

Findings
1. HORIZONTAL STABILIZER ATTACHMENT - OVERLOAD
2. HORIZONTAL STABILIZER - SEPARATION
3. (C) EMPENNAGE - SEPARATION
4. WING - OVERLOAD
5. WING - SEPARATION

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT - UNCONTROLLED

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: DESCENT - UNCONTROLLED

Findings
6. OBJECT - RESIDENCE

Factual Information

"THIS CASE WAS MODIFIED AUGUST 2, 2006."

HISTORY OF FLIGHT

On March 4, 1998, about 1410 eastern standard time, a Piper PA-23-160, N3374P, was destroyed when it struck a multiple family dwelling in Somerville, New Jersey. The certificated private pilot and pilot rated passenger were fatally injured. Visual meteorological conditions prevailed for the personal flight conducted under 14 CFR Part 91. No flight plan had been filed for the flight, which departed from Greenwood Lake Airport (4N1), West Milford, New Jersey, about 1350.

The flight originated from Marlboro Airport (2N8), Matawan, New Jersey, earlier in the day. The pilots flew to Old Bridge Airport (3N6), English Town, New Jersey, where the airplane was serviced with 50.1 gallons of 100 Low Lead aviation grade gasoline. The flight then departed for 4N1 where the pilots ate lunch, and then departed for Marlboro Airport.

Several witnesses in the accident site area observed the airplane. Most of the witnesses reported they heard a noise, looked up, and observed the airplane in a nose down attitude. Some reported it was spinning as it descended, while others reported seeing parts of the airplane descending. One witness located in a housing complex north of the accident site reported that he observed the airplane overfly his location heading to the south. After the airplane had passed his location, he continued to watch it. The witness observed the top of the tail start to oscillate with increasing intensity, and then the entire tail section separated from the airplane, after which the airplane nosed down.

Another witness located about 1/2 mile north of the accident site saw a large number of birds flying in the area, and then saw the airplane which she first thought was a bird. As she watched the airplane it suddenly dipped and then descended. She saw parts separate from the airplane and watched it until it disappeared from view. She said the birds were flying independently of each other not in a flock.

The airplane struck the roof of a multiple family condominium dwelling, and exited through the front wall. The airplane came to rest in the street in front of the building.

The accident occurred during the hours of daylight at 40 degrees, 30 minutes, 45.9 seconds North Latitude and 74 degrees, 38 minutes, 05.9 seconds West Longitude.

OTHER DAMAGE

The roof and front siding for the first and second floors of the condominiums at 485 and 487 Brookside Lane were damaged. The damage was estimated to be about $150,000.00.

PERSONNEL INFORMATION

The pilot held a private pilot certificate for airplane single and multi-engine land, and a mechanic certificate for airframe and powerplant. He was issued a third class FAA airman medical certificate with no limitation on August 26, 1996. The pilot's logbook was not recovered. According to his last FAA airman medical application, the pilot had a total time of 725 hours. The pilot's total multi-engine time was not determined. According to FAA records, his last flight review took place on September 26, 1996, when he received his multi-engine rating.

The pilot rated passenger held a commercial pilot certificate for airplane single and multi-engine land, private privileges for single engine sea, and instrument airplane. He also held a flight instructor certificate for airplane single engine land and instrument airplane. He was issued a first class FAA airman medical certificate with no limitation on November 5, 1997. According to his last FAA airman medical application, he had a total time of 1,010 hours. According to FAA records, his last flight review took place on March 11, 1997, when he renewed his flight instructor certificate.

AIRCRAFT INFORMATION

The airplane was a 1958 Piper PA-23-160, which had been modified by Supplemental Type Certificates (STC) which were known as a Geronimo Conversion. The investigation revealed that the registered owner had sold the airplane to the accident pilot. The contract was written so that the transfer of title would not take place until the final payment had been completed. The accident pilot was still making payments, and the registration remained in the name of the seller.

RADAR AND OTHER REMOTELY RECORDED DATA

Radar data was received from the New York Air Traffic Control Center in the National Track Analysis Program (NTAP) format. The data was changed from a latitude/longitude format to a X/Y format, with the accident site as the zero reference point.

A target that was using a transponder code of 1200 was identified traveling on a heading of about 160 degrees, between 2,000 feet mean sea level (msl), and 1,800 feet msl. The heading was consistent with witness statements. This was the only target that was near the accident site at the time of the accident. The last radar contact was recorded at 1411:42, when the target was .94 nautical miles northwest of the accident site, at an altitude of 1,800 feet msl. The estimated ground speed of the target was 146 knots.

WRECKAGE AND IMPACT INFORMATION

The airplane was examined at the accident site on March 4, through March 6, 1998. The debris path, made up of three groupings, was along a heading of between 095 and 100 degrees magnetic with lighter objects further away than heavier objects. The first group consisted of the cockpit/cabin, aft fuselage, both inboard wing panels, the left aileron, and both engines and their propellers. This was found in front of the damaged residences. The next group consisted of outboard wing panels, both wing tips, the right aileron, the vertical stabilizer and rudder, the horizontal stabilizer and elevator, and the aft fuselage skin. The furthest objects were the two fiberglass wingtips, which were about 670 feet from the main wreckage. The third group consisted of paint chips that continued on a magnetic heading of about 099 degrees from the accident site for an additional 790 feet beyond the wing tips.

The roof of the airplane was pushed rearward and crushed, and the sides of the cabin were absent above about 18 inches. Both occupant seats in the airplane were broken loose from the their attach points. The right seat occupant was found restrained by his seat belt. The left seat occupant was found separated from his seat. A check of the left seat belt found it would latch and unlatch without problem.

The left and right engines were separated from their engine mounts. A tachometer cable remained attached between the right engine and the right engine firewall. Valve train continuity was verified for both engines. Compression was found in all cylinders. Spark was

obtained from all terminals of all magnetos. Both engine oil screens were clear of debris. Fuel was found in the fuel lines and engine driven fuel pumps of both engines.

Both carburetors were broken open. The fuel screens in the carburetors were free of debris. The main jets were not clogged. Both carburetors had metal floats.

Both propellers had received impact damage. Chordwise scoring and leading edge damage was found on all blades. Blade bending was typically rearward along a broad arc radius. One blade of the right propeller also exhibited moderate torsional bending. The blade shanks of the propellers had rotated from their respective indexed position, with more slippage visible on the left engine propeller blades. The left propeller low pitch lock pins were engaged. The right propeller piston and pitch change links were destroyed.

The mixtures were found in the full forward position, and the throttles were mid-range with the right throttle about 1 inch ahead of the left throttle. The left propeller control was mid-range, and the right propeller control was in the feathered position. The magneto switches were non-locking toggle switches with up for ON and down for OFF. The left magneto switch of the left engine was not identified. The other magneto switches were in the OFF position. The carburetor heat controls for both engines were in the OFF position. The landing gear and flap control handles were in the neutral positions. The fuel selectors were on the inboard tanks, and the crossfeed was OFF.

Flight control continuity was verified for the rudder system between the rudder pedals and the rudder bellcrank. Flight control continuity was verified between the aileron chain, which was separated in the middle, and the mid wing position. Elevator continuity was verified between the bottom of the control column, and the pushrod in the aft fuselage. The pushrod between the aft fuselage and elevator was fractured by bending in mid span.

The left engine inboard wing panel with engine firewall and landing gear was separated from the fuselage. The attached wing flap was in the up position.

Both wing tips and both outboard wing panels were recovered away from the main impact point. The screw holes had been pulled out consistent with downward bending of the wing tips. Compression and downward bending was visible along the bottom of the fracture between both outboard wing panels, and the inboard wings. The fracture surfaces on the breaks were bright and granular in appearance with no evidence of fatigue. The faces of the fractures were at an approximate angle of 45 degrees. The wing tips were constructed of fiberglass and attached to the wing by screws. The fiberglass had separated from the metal by pulling out and away. About one gallon of a liquid similar in smell, sight, and touch to 100 LL aviation grade gasoline was found in the left outboard wing.

The rudder was attached to the vertical stabilizer by the bottom hinge. The top hinge had pulled out of the front of the rudder. The rudder torque tube was pulled out of the base of the rudder. Sheet metal on the rudder was bent downward near the missing torque tube. The sheet metal next to the rudder hinges was bent out similar to overtravel on both sides of the rudder. Examination of the rudder horn and rudder stop screw found no evidence of impact marks. The vertical stabilizer was attached to the horizontal stabilizer at four points. There was compression buckling on the lower left side of the vertical stabilizer.

The horizontal stabilizer and elevator were found about 30 feet from the rudder and vertical stabilizer. The elevator was stuck vertically in the ground, and the horizontal stabilizer was lying next to it. The outboard six inches of the left elevator was crushed inboard. The

outboard 19 inches of the leading edge of the left side horizontal stabilizer was crushed rearward to the forward spar in two distinct impressions. Compression wrinkles were also visible on the trailing edge of the horizontal stabilizer, in line with the compression wrinkles on the leading edge. On the right side, leading edge of the horizontal stabilizer, there was a cut, about 19 inches outboard of the right side fuselage. The inboard leading edge on the right side was crushed laterally in an outboard direction

The horizontal stabilizer was attached to the fuselage by four attach points. The rear attach points were bolts that passed vertically through the horizontal stabilizer and were located 4 1/2 inches from the centerline of the stabilizer. The forward attach points were brackets that were riveted to the leading edge, and bolted to the airframe structure.

At the rear attach point, compression wrinkles were found in front of the bolt hole on the left side, and the bolt hole on the right side was elongated. The bolt and nut for the left side were not recovered. The bolt and nut on the right rear attach point were still in place with a 12 inch piece of fuselage stringer attached to the bolt.

Both forward brackets were separated from the front spar of the horizontal stabilizer. Both brackets had separated from the horizontal stabilizer consistent with the horizontal stabilizer being rotated to the left and rear. The rivets on the right side bracket had failed laterally, and there were lateral scrape marks on the separated bracket. The middle rivet hole was elongated laterally. The upper rivet on the left side bracket has failed in a lateral motion. The middle rivet had pulled out of the spar toward the right, in a lateral motion.

The aft fuselage skin contained longerons and stringers, along with mounting brackets for the horizontal stabilizer that had separated from the aft fuselage. The skin had the appearance of being flexed multiple times in both directions. Paint was missing from deformed areas of the skin.

MEDICAL AND PATHOLOGICAL INFORMATION

Toxicological testing from the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma was negative for drugs and alcohol for the pilot and pilot rated passenger.

Autopsies were conducted on the pilot and passenger by medical examiners from the New Jersey Regional Medical Examiner's Office located in Newark, New Jersey, on March 5, 1998.

TESTS AND RESEARCH

A portion of the leading edge of the left horizontal stabilizer was cut out and forwarded to the NTSB metallurgical laboratory in Washington, DC. According to the Materials Laboratory Factual Report:

"...The impact ripped the leading edge skin in the impact damage area...and created two skin flaps. The inboard flap...was bent up, aft, and inboard; the outboard flap...was bent aft and slightly outboard...the leading edge crushed in the aft and upward direction forming compression buckling of the skin...A small 'L'-shape impact, as if from a contact with a somewhat hard time, was found on the leading edge of the horizontal stabilizer in the area of the inboard flap...The leading edge of the stabilizer otherwise contained no evidence of heavy scratching or severe rubbing damage, indicating that, with the exception of the small area, the impact was with a relatively soft object...."

"...The bolt separated through the threaded portion. Examination of the fracture revealed features typical of an overstress...."

ADDITIONAL DATA/INFORMATION

Examination of the left horizontal stabilizer and elevator failed to find any evidence of blood, feathers, or bird remains. A ground examination of the area from the accident site, to 1/2 mile north of the accident site, failed to find any evidence of a bird carcass, or bird feathers. Although the airplane came to rest in an area of populated by multi-family dwellings, the surrounding area was rural in nature, and the home of small animals and carnivores.

The impact damage to the left horizontal stabilizer outboard end was examined by Museum of Natural History personnel who swabbed it for DNA. None was found. Photos of the wreckage were examined by the Air Force Bird/Wildlife Aircraft Strike Hazard Team. Neither could attribute the damage to a bird strike.

The aircraft wreckage was released to the Chief of Police, Hillsborough Police Department on March 6, 1998.

Pilot Information

Certificate:	Private	**Age:**	34, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):		**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	08/26/1996
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	725 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N3374P
Model/Series:	PA-23-160 PA-23-160	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	23-1334
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	07/05/1997, Annual	**Certified Max Gross Wt.:**	3800 lbs
Time Since Last Inspection:	95 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	4745 Hours	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-320-B3B
Registered Owner:	GIBSON AIR ACADEMY INC.	**Rated Power:**	160 hp
Operator:	LINO FAZIO	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	TTN, 213 ft msl	**Distance from Accident Site:**	16 Nautical Miles
Observation Time:	1354 EST	**Direction from Accident Site:**	222°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Visibility**	10 Miles
Lowest Ceiling:	Broken / 5500 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	8 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	270°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	10°C / -2°C
Precipitation and Obscuration:			
Departure Point:	WEST MILFORD, NJ (4N1)	**Type of Flight Plan Filed:**	None
Destination:	MATAWAN, NJ (2N8)	**Type of Clearance:**	None
Departure Time:	1350 EST	**Type of Airspace:**	Class E

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	ROBERT L HANCOCK	**Report Date:**	08/02/2006
Additional Participating Persons:	MORGAN BROWN; ALLENTOWN, PA DANIEL J WEDO; TRENTON, NJ MICHAEL MC CLURE; VERO BEACH, FL EDWARD G ROGALSKI; WILLIAMSPORT, PA		
Publish Date:			
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